

ATEX-EM explosion-proof card reader

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**ATEX EXPLOSION PROOF RFID CARD READER
125 kHz EM4100/4200**



INSTRUCTION MANUAL

REV.0

(12 May 2020)



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ATEX EXPLOSION PROOF PROXIMITY CARD READER

IP66 ATEX proximity card reader with ProxTech PREMIUM-EM reader for tank terminal facilities



Model ATEX-xx
ATEX certified proximity card reader

FEATURES AND BENIFITS

- Small design, allows easy integration
- ATEX approval II 2 G / Ex db IIC T6 Gb and ATEX II 2 D / Ex tb IIIC T85°C IP66
- Includes one (1) explosion proof gland for entering reader cable .
- Clear LED indication indicating acceptance of card. (Red, yellow, green)
- Pre-assembled with screw terminals for easy field connection.

The ATEX-xx RFID card reader series is a complete range of explosion-proof RFID card readers suitable for applications on tank terminal area or any other area which has ATEX classified zones.

The model ATEX-EM has been completed with an PREMIUM-EM reader and requires connection to a door controller unit (not included in this part number) which will provide also the required power supply for the ATEX-EM reader. No external power supply to the reader is allowed.

Specifications.

General

Construction	: Marine grade copper free grey coloured aluminium housing. Painted marine coating RAL6024 (green).
Mounting	: Wall mounted with two hinges. Use bolt M8.
Glands	: One (1) explosion proof gland 3/4" NPT.
Protection	: ATEX II 2 G / Ex db IIC T6 Gb and ATEX II 2 D / Ex tb IIIC T85°C IP66.
Connection	: by screw terminal max 0,5mm ² .
Dimensions (ØxD)	: 160x144mm
Shipping weight/net	: 3kg/2,14Kg including gland.

Card reader

Model	: ProxTech PREMIUM-EM RFID reader.
Power	: 5-13,6VDC at 35/100mA (Average/Peak). Linear power supply recommended.
Format	: Selectable. Output formats supported (depending on reader version): Wiegand, Clock/Data, RS232 (9600,n,8,1) with both EIA compatible levels and TTL levels. RS485 available as option
Supported transponders	: 40 bit read only transponders EM4x01 family, HiTag2 Public Mode A, TEMIC e5550 and equivalent devices
Reading distance	: 2,5 cm (passive key card and power at 12VDC.)
Temperature range	: -20°C to +60°C and 95% humidity non condensing.
Indicator	: Acceptance LED red, yellow, green. Beeper included.

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GENERAL DESCRIPTION

The ATEX-xx explosion protected RFID reader has been designed for access controlsystems in hazardous areas. The reader consists of an ATEX rated heavy duty aluminium epoxy coated casting with a chemical resistant viewing window.

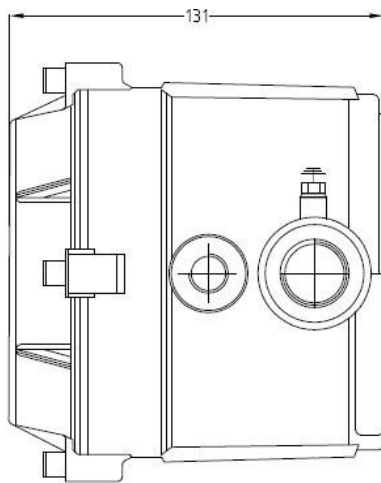
The ATEX-xx reader series can be provided with several types of reader in order to make easy integration into any type of access control system.

Packaging contents

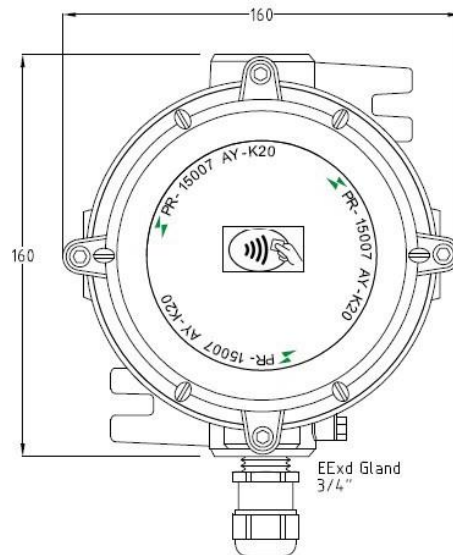
The ATEX-EM kit consists of:

- 1) One (1) ATEX-xx housing pre-assembled with:
 - A RFID card reader type PREMIUM-EM
 - Screw terminal block.
 - An ATEX approved brass gland 3/4" with rubber 8-10mm.
- 2) One (1) User manual which includes the ATEX certification.

MECHANICAL SPECIFICATIONS



BOTTOM VIEW



FRONT VIEW



EU Directives covered by this declaration:
72/9/EC Low Voltage Directives
89/336/EEC Electromagnetic Compatibility Directive
94/9/EC Equipment or Protective System for use in
Potentially Explosive Atmospheres.

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INSTALLATION

1. Find a place to install the ATEX-EM.
2. Drill two holes (M6) and fix the reader.
3. Unscrew the cover and insert the connection cable through the gland and make connection to the screw terminals as per drawing which correspond with the type of reader installed into the unit.
4. Follow the directions of the card reader manufacturer regarding the type of cable to be used as well the maximum length allowed.

CONNECTIONS

Colour	Name	Function
BLACK	0V	Connect 0V from power supply.
RED	+VDC	Connect +5V - +13.6V from power supply
BLUE	BUZZER	Controls Buzzer
GREEN	GRN-LED	Controls Green LED in LED Mode 1 or both Red and Green LEDs in LED Mode 2
ORANGE	RED-LED	Controls Red LED in LED Mode 1
YELLOW	YEL-LED	Controls Yellow LED in LED Mode 1
BROWN	DATA / DATA1	Outputs RFID tag code in selected format
WHITE	CLOCK / DATA0 / TTL-TX	Outputs RFID tag code in selected format
PURPLE	RS-232 TX	Output RS-232
GREY	CARD PRESENT	Pulses low when an RFID tag is detected. It stays low while the module output is active

Note : LED and BUZZER inputs are active low. The input is internally pulled high and may be pulled low by an open collector transistor or driven low by the output of a 5V CMOS or TTL gate.

Power Connections

The reader has an internal low dropout 5V regulator and so for maximum performance the input voltage must be smooth DC between 5.5V and 13.6V. The reading distance is unchanged for input voltages between 5.5V and 13.6V. For input voltages below 5.5V the read range drops off slightly as given in the specifications earlier. If 5V is supplied to the reader this should be noise-free to achieve maximum possible read ranges.

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OUTPUT MODE SELECTION

The 6-way switch is used to select the output format and LED mode. The required setting is selected from the following tables:

Output mode table

SW1	SW2	SW3	SW4	Output mode
ON	ON	ON	ON	Inhibit – Turn off coil
ON	ON	ON	OFF	<i>Not used</i>
ON	ON	OFF	ON	<i>Not used</i>
ON	ON	OFF	OFF	<i>Not used</i>
ON	OFF	ON	ON	<i>Not used</i>
ON	OFF	ON	OFF	RS232 – 2400,n,8,2
ON	OFF	OFF	ON	RS232 – 4800,n,8,2
ON	OFF	OFF	OFF	RS232 – 9600,n,8,1
OFF	ON	ON	ON	Clock/Data 8 characters
OFF	ON	ON	OFF	Clock/Data 9 characters
OFF	ON	OFF	ON	Clock/Data 10 characters
OFF	ON	OFF	OFF	Clock/Data 13 characters
OFF	OFF	ON	ON	<i>Not used</i>
OFF	OFF	ON	OFF	Wiegand 26 bits
OFF	OFF	OFF	ON	Wiegand 34 bits
OFF	OFF	OFF	OFF	Wiegand 42 bits

LED mode table

Mode #	SW5	LED Mode
1	ON	3 Individual LED's each controlled by their own input
2	OFF	RED/GREEN with single control line (GRN-LED)

Note :

In LED Mode 2, both RED and GREEN leds are controlled by the GRN-LED input. When the GRN-LED input is floating or pulled high, the RED led is on and the GREEN led is off. When the GRN-LED input is pulled low (connected to 0V) the GREEN led is on and the RED led is off. The YELLOW led is always off.

Continuous/Single Transmission Mode Table

Mode	SW6	Operation
Continuous	ON	While a tag is in the reader's field the reader will continuously transmit the code in the format chosen by DIP-switches 1-4. The repetition period is dependent on the format chosen but varies between 65ms and 100ms.
Single	OFF	Single transmission when tag is brought into the field. Tag must be removed from field for at least 1 second before a read of this tag is possible again.

NOTE : this “continuous transmission” mode can not be guaranteed to work properly on some controllers, depending on the data interfaces. However, the “single transmission” mode will work with all controllers.

It is therefore recommended to test this function prior to site activation.

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DATA OUTPUT FORMATS

RS232 Output modes

There are two RS232 outputs from the reader :

- 1) The RS-232 wire (purple) outputs EIA compatible voltage levels. This output is suitable to connect directly to e.g. the serial COM port of a PC.
- 2) The TTL-TX wire (white) outputs TTL levels: +5V for a binary '1' state and 0V for a binary '0' state. This output is suitable to connect directly to the USART of a microprocessor.

RS232 format data is outputted from both wires when the RS232 modes are selected.

The data format is selectable between:

- 1) 9600,N,8,1
- 2) 4800,N,8,2
- 3) 2400,N,8,2

The tag code is output in the following structure:

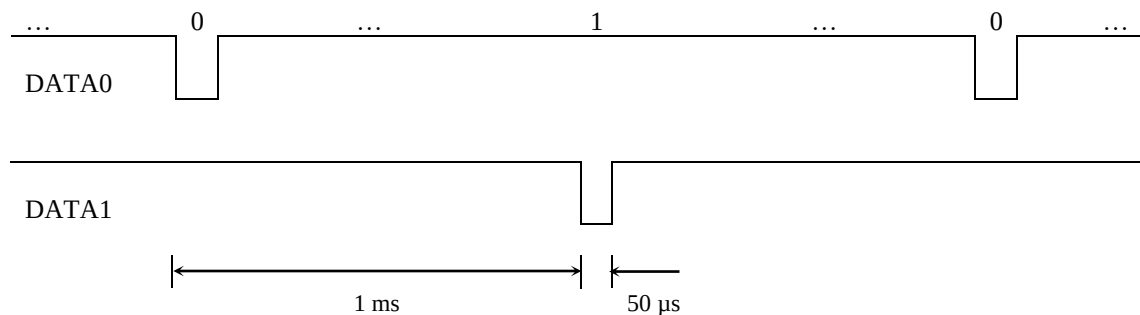
# (23h)	DATA (ASCII)	CR (0Dh)
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The DATA bytes consist of 11 bytes. Each data byte represents 4 bits in the ASCII range "0" (30 hex) to "F" (46 hex). The last data byte is a checksum, performing an XOR on the 4 least significant bits of each data byte.

Wiegand Output Modes

In this mode the tag code is pulsed out on DATA0 (white wire) and DATA1 (brown wire). Both are normally high. When a tag is presented to the reader 26/34/42 bits are transmitted in the following way:

A binary 1 is represented by a 50 us pulse low on DATA1. A binary 0 is represented by a 50 us pulse low on DATA0. There is a 1 ms inter bit delay.



42 bit mode

42 pulses are transmitted :

- The first bit is the even parity of tag bits 1-20.
- All 40 bits of the tag code (MSB first).
- The last bit is the odd parity of tag bits 21-40.

34 bit mode

34 pulses are transmitted:

- The first bit is the even parity of tag bits 9-24.
- The least significant 32 bits of the tag code (MSB first).
- The last bit is the odd parity of tag bits 25-40.

26 bit mode

26 pulses are transmitted:

- The first bit is the even parity of tag bits 17-28.
- The least significant 24 bits of the tag code (MSB first).
- The last bit is the odd parity of tag bits 29-40.

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Clock&Data Output Modes

In this mode the decimal tag number is clocked out on CLOCK (white wire) and DATA (brown wire) at 400 characters per second. The format is standard as found on Track 2 of a magnetic card:

10 leading 0's	SS	DATA	ES	LRC	10 trailing 0's
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SS = start sentinel (B hex).

ES = end sentinel (F hex).

LRC = longitudinal redundancy check.

DATA varies according to the mode selected :

13 digits mode

DATA = 13 decimal digits with leading zeros. The most significant decimal digit is transmitted first.

10 digits mode

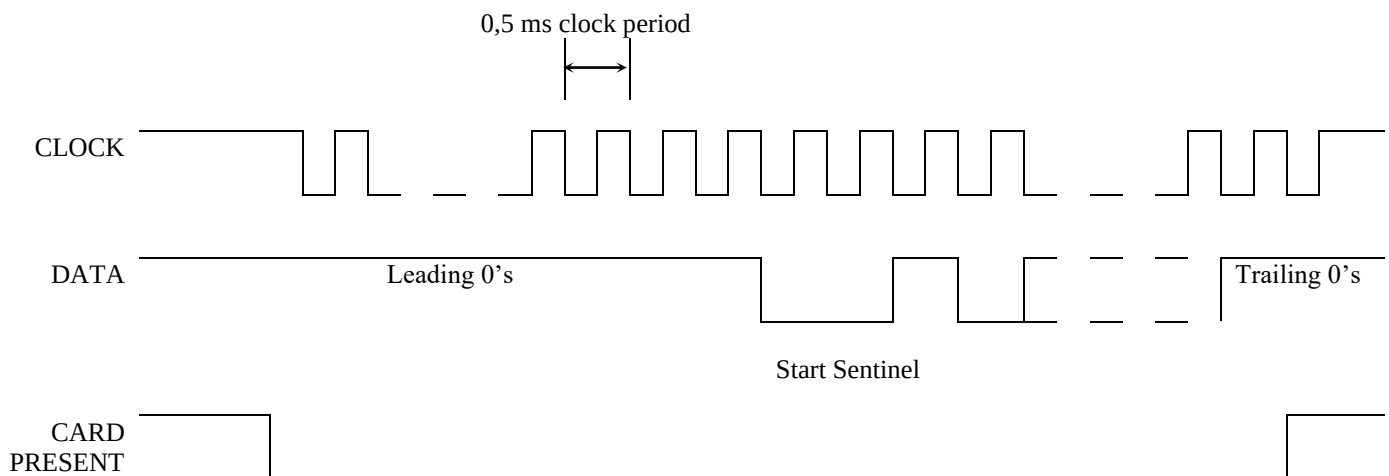
DATA = 10 decimal digits with leading zeros. The most significant decimal digit is transmitted first.

9 digits mode

DATA = 9 decimal digits with leading zeros. The most significant decimal digit is transmitted first.

8 digits mode

DATA = 8 decimal digits with leading zeros. The most significant decimal digit is transmitted first.



Each character is 5 bits long. The first four bits are the hex digit (0-F) least significant bit first. The fifth bit is an odd parity bit. A “0” is represented by a high level on the DATA-wire and a “1” is represented by a low level on the DATA-wire. Data is set up on the falling edge of the clock and is stable on the rising edge of the clock.

The CARD PRESENT output goes low for the duration of the transmission, simulating the CARD PRESENT from a mag stripe card reader.